STEP-BY-STEP SYSTEMS
NO. 1
TRANSMISSION TEST LINE CIRCUIT AND PERMANENT SIGNAL RELEASE CIRCUIT FOR CONNECTORS AND SWITCHMAN'S TALKING LINE CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

	Superseded	Superseded By
B.1	684C subset Fig. 13	684BA subset Fig. 15

B.2 (A) 33A varistor N Option BZ (A) 33L varistor M option.

	Removed	Replaced By
B.3	289A plug 396A transmitter, L4R Cord & 716D receiver in Figs. 14 & 7	52A head telephone set in Figs. 14 & 7

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 15 is added to show 684BA subset.

D.2 Fig. 13 is rated "Mfr. Disc."

D.3 Reference to Fig. 13 is changed to Fig. 15 in Note 102.

D.4 Fig. 15, and options N and M are added to feature or options table and note 108.

D.5 Figs. 5 and 12 and the equip. designation are changed to show (PS-T) jack instead of (PS & T) jack.

D.6 In note 102, Fig. 13 (Repl. by Fig. 15) was specified "1 per cabinet".

D.7 In Figs. 55 the 22, 20 or 16GA wire was 22 or 19.

D.8 In Fig. 9, the handset and cord assembly were D-81763 hand test set.

D.9 Fig. 51 is revised to show 2 sets of T & R punchings for connection to Fig. 53, to subset for line load control, etc.

D.10 In note 108 the rating of Fig. 14 is changed from "Std." to "A&M Only".

D.11 Equipment note 204 is added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-MHK-RLL-AL

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT

CD-32021-01
Issue 2-B
Appendix 3-D
Dwg. Iss. 8-D

STEP-BY-STEP SYSTEMS
NO. 1
TRANSMISSION TEST LINE CIRCUIT AND PERMANENT SIGNAL RELEASE CIRCUIT FOR CONNECTORS AND SWITCHMAN'S TALKING LINE CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 2, the 366 jack now designated Q option, was formerly designated "V" option only.

D.2 In Note 102, under "Talking Station for use with Hand Test Set per Fig. 9 or Equivalent" the blocks for Repeater Frames, Sel. & Misc. Frames, R.R. Bays, and Automatic Ticketing Circuit Frames was added, and in Note 108, the line referring to "Q" option is added.

D.3 The object of these changes is to specify the type of jacks for frames on which the above equipment is located. Test jacks for these circuits were not formerly specified on this drawing as there was only one installation of such equipments, provided on a "Provisional" Basis.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-OCH-FJS-UX

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STEP-BY-STEP SYSTEMS
NO. 1
TRANSMISSION TEST LINE CIRCUIT AND PERMANENT SIGNAL RELEASE CIRCUIT FOR CONNECTORS AND SWITCHMAN'S TALKING LINE CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
528 Receiver, Fig. 7	716D Receiver, Fig. 7

B.2 Added

2 - 215 Type Jacks in Fig. 14, (A & M Only)

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 14 is added (A & M Only) to permit specifying this drawing when additional traffic register racks are added in an existing office using earlier talking line circuits which are to be extended to the new rack.

D.2 Notes 102 and 108, and the options used table are revised to include reference to Fig. 14.

D.3 Cross-connection, Fig. 56 is added.

4. CONNECTING CIRCUITS

When this circuit is listed on a key sheet, the Connecting Information thereon is to be followed.

4.1 Test Line to 12C Test Desk SD-31400-01.

4.2 Test Distributor Control Circuit SD-31401-01.

4.3 Permanent Signal Test Circuit SD-31402-01.

4.4 Test Line Circuit for One Way Transmission Testing SD-96000-01.

4.5 Key and Lamp Circuit in No. 14 Local Test Desk SD-90050-01.

4.6 Connector Test Line SD-31653-01.

4.7 Message Ticketer Trunk Test Circuit SD-31944-01.

4.8 Local Subscriber Line Circuit in Dial Office. SD-31531-01.

4.9 (For Fig. 14 - A & M Only)

4.91 Switchman's Talking Line SD-31619-01.

4.92 Switchman's Talking Line SD-31231-01.

4.93 Switchman's Talking Line ES-30428-01.

All other headings, no change

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-OCH-WLF

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT

CD-32021-01
Issue 2-B
Appendix 1-D
Dwg. Iss. 6-D

STEP-BY-STEP SYSTEMS
NO. 1
TRANSMISSION TEST LINE CIRCUIT AND PERMANENT SIGNAL RELEASE CIRCUIT FOR CONNECTORS AND SWITCHMAN'S TALKING LINE CIRCUIT

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS.

C.1 The adjustment for

		Soak	Opr.	N.O.	Hold	Rel
(ST) relay Y142 was	Test	FS	17.5	11.3	1.5	0.8
	Readj.	FS	16.5	11.9	1.3	1.0

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-HCM-WLF

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT

CD-32021-01
Issue 2-B
Dwg. Issue 5-B

STEP-BY-STEP SYSTEMS
NO. 1
TRANSMISSION TEST LINE CIRCUIT AND PERMANENT SIGNAL RELEASE CIRCUIT FOR CONNECTORS AND SWITCHMAN'S TALKING LINE CIRCUIT

CHANGES

A. CHANGED OR ADDED FUNCTIONS

A.1 Provides a chain relay for each floor to prevent failure to release connectors in case an attempt is made to use the circuit at the same time on more than one floor.

B. CHANGES IN APPARATUS

B.1 Added
U981 Relay CH, X option, Fig. 4

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO CHANGED OR ADDED APPARATUS

C.1 Prior to issue 5-D, the soak value for relay (ST) was "20" , instead of "FS".

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "X" option is shown in Fig. 4 for use when connectors are to be released on more than one floor, and Note 102 is revised to specify Figs. 3, 4 and 8 as one per floor having connectors instead of one per office. "X" option provides for extending the chain circuit thru all Fig. 4 to prevent interference in case an attempt is made to release connectors on more than one floor at a time. No attempt should be made to release two or more connectors on the same floor at the same time. For this reason the cord per Fig. 8 is specified one per floor. Multiple straps were added in Fig. 3 to provide for furnishing one Fig. 3 per floor.

D.2 Note 103 formerly read "the loop res. of leads "T" &"R" from the (PS) relay of Fig. 4 to the most remote jack of Fig. 5 or 12 shall not exceed 3.2 ohms". This note was revised to permit the most economical division of the 4 ohm limit of the permanent signal release circuit.

D.3 Note 101 was revised to specify fusing Fig. 11, when provided, with the first Fig. 4.

D.4 Letter options were assigned for the jacks of Figs. 2, 5, 7, and 10 and Note 102 was revised to specify which jacks are used at the various locations. In Note 102 the word "Building" was formerly "Office" wherever it occurs.

D.5 The last sentence of Note 105 was added to separate the permanent signal release circuit from the talking line circuit when the former is added in an office where the latter is already in use.

D.6 Notes 106 and 107 were added.

D.7 Cross Connection Fig. 55 and Equipment Notes 202 and 203 were added, and Fig. 52 was rated Mfr. Disc. to provide for running the T and R leads between Figs. 3, 4, and 5 direct instead of thru the distributing frame.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit provides for (a) intercommunicating between maintenance men in the switch room, (b) for clearing permanent signals due to the calling party holding the connector and (c) for one-way transmission tests of connectors.

2. WORKING LIMITS

2.1 Maximum conductor loop resistance from the most remote jack at the connector frame to perm. signal test circuit, 4 ohms.

3. FUNCTIONS

3.1 To provide a talking circuit for use between switch frames, message register racks and traffic register racks.

3.2 To provide for clearing permanent signals due to the calling party holding the connector.

3.3 To provide for one-way transmission tests of connectors in conjuction with transmission testing circuit.

3.4 To provide a talking circuit from AB toll transmission selector, toll transmission selector and coin control selector frames by use of a subscriber line circuit in the dial office.

4. CONNECTING CIRCUITS

When this circuit is listed on a key sheet, the Connecting Information thereon is to be followed.

4.1 Test Line to 12C Test Desk SD-31400-01.

4.2 Test Distributor Control Circuit SD-31401-01.

4.3 Permanent Signal Test Circuit SD-31402-01.

4.4 Test Line Circuit for One Way Transmission Testing SD-96000-01.

4.5 Key and Lamp Circuit in No. 14 Local Test Desk SD-90050-01.

4.6 Connector Test Line SD-31653-01.

4.7 Message Ticketer Trunk Test Circuit SD-31944-01.

4.8 Local Subscriber Line Circuit in Dial Office. SD-31531-01

DESCRIPTION OF OPERATION

5. TALKING LINE

5.1 The talking line is used by prearrangement when two testers at different locations cooperate on a test. No signaling features are provided. Fig. 1 supplies talking battery to all talking stations and provides for connection to the No. 14 local test desk when required. Fig. 2 provides talking station jacks at switch frames, and, when permanent signal release and transmission testing is not required, at connector frames. Fig. 6 provides an induction coil and condenser circuit similar to that of a local subscriber station to operate with the talking station jacks per Fig. 7 located at traffic or message register racks or the IDF. A hand test set per Fig. 9 is used with the talking jacks of Fig. 2 and Fig. 5 and an operators set is used with the talking jacks of Fig. 7. A varistor is provided in Fig. 6 to reduce the intensity of acoustic shocks. When the operator set is plugged into the jacks of Fig. 7 the circuit to the induction coil of Fig. 6 is closed.

6. TRANSMISSION TESTING

6.1 The key in Fig. 3 is operated to its (TRANS) position when transmission tests are to be made on connectors in a hundred group other than that in which the transmission test line is terminated. By means of a patching cord described in the BSP on one way transmission tests, the jack of Fig. 5 is patched to jacks 3 and 4 in the connector frame on which the "99" test line of each connector group is terminated. This connects 1 milliwatt testing power to the "99" terminal and transmission tests may then be made by dialing this terminal from the transmission test circuit.

7. RELEASE OF CONNECTORS HELD BY THE CALLING PARTY

7.1 When connectors are held by the calling party if the subscriber loop is not too low in resistance the connectors may be released by operating the key of Fig. 3 to the (PS RLS) position and then patching the jack of Fig. 5 to the test jack of the connector using the low resistance cord of Fig. 8. This will result in connecting the permanent signal release circuit to the connector. This latter circuit will test the subscriber line for polarity and low resistance, and if conditions are favorable will apply battery and ground to shunt down the (A) relay of the connector releasing the same.

7.2 The detailed circuit operation is as follows. As the connector will test busy there will be ground on the sleeve which will be connected to the sleeve of the jack in Fig. 5 operating relay (ST). If the permanent signal test circuit is not busy ground will be standing on lead "G" which on the operation of relay (ST) will cause relay (SO) to operate and lock to the sleeve of the connector through the back contact of relay (EC). The operation of relay (SO) will cause the release of relay (ST). Ground from lead "G" will then, if no other (CH) relays in the test distributor control circuit, or the test line circuit to the test distributor are operated, cause the operation of relay (CH) which will lock up to relay (EC). The operation of relay (CH) will operate relay (PS) disconnecting the jack of Fig. 5 from Fig. 3 and connecting it to the permanent signal test circuit, and also connecting grounds to leads "ST" and "BC". This will cause the permanent signal test circuit to begin functioning, first removing ground from lead "G" then testing the subscriber line for polarity and resistance, and if the resistance is sufficient to insure against blowing fuses(approximately 50 ohms) to apply battery and ground which will shunt down the (A) relay of the connector. This will remove ground from the sleeve releasing relay (SO). The release of relay (SO) will remove ground from lead "BC" giving an indication to the permanent signal test circuit that the connector has been released. The latter circuit will then connect ground to lead "EC", operating relay (EC) and restoring the circuit to normal. If the connector is not released due to the fact that the test circuit found the resistance of the loop too low to apply the shunting battery and ground then the test circuit will complete its cycle connecting ground to lead "EC". This will operate relay (EC) which will lock to the sleeve of the connector and will release relay (CH) and in turn (PS). The object of slow release relay (ST) and slow operate characteristics of relays (SO), (CH) and (PS) is to guard against plug fumbling when patching the jack of Fig. 5 to the test jack of the connector. In order that proper tests of the subscriber line may be made it is necessary that the tip and ring leads of the patching circuit be completed by the time relay (PS) operates.

7.3 As the test man is observing the action of the connector no signal is necessary to indicate whether or not the connector releases. If the connector does not release after an interval of approximately 10 seconds following the completion of the patch it is an indication either that the subscribers loop is too low in resistance, that the permanent signal test circuit is busy or that there is trouble in the circuit.

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